

TOPIC: 191005
KNOWLEDGE: K1.01 [2.8/3.1]
QID: P26

Reactor coolant pump motor amps will _____ if the rotor is locked and the motor speed will _____ if the rotor shears.

- A. increase, increase
- B. increase, decrease
- C. decrease, increase
- D. decrease, decrease

ANSWER: A.

TOPIC: 191005
KNOWLEDGE: K1.01 [2.8/3.1]
QID: P227

A reactor plant is operating normally at 80% power when a reactor coolant pump (RCP) shaft seizes. Which one of the following indications would not accompany the seized shaft?

- A. Reactor coolant system pressure transient.
- B. Reactor trip on low reactor coolant system flow rate.
- C. Decreased flow rate in the remaining reactor coolant loop(s).
- D. Increased current to the affected RCP with possible breaker trip.

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.01 [2.8/3.1]
QID: P327

A reactor plant is operating at 100% power when a reactor coolant pump (RCP) malfunction occurs. Thirty seconds after the malfunction, which one of the following can be used by an operator to determine whether the malfunction is a locked RCP rotor or a sheared RCP rotor? (Assume no operator action is taken.)

- A. Reactor trip status
- B. Loop flow indications
- C. RCP ammeter indications
- D. Loop differential temperature indications

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.01 [2.8/3.1]
QID: P1127

During a locked reactor coolant pump (RCP) rotor event, RCP current will...

- A. increase due to the increased rotor torque.
- B. increase due to the increased stator counter electromotive force (CEMF).
- C. decrease due to the decreased pump flow.
- D. decrease due to the increased rotor CEMF.

ANSWER: A.

TOPIC: 191005
KNOWLEDGE: K1.01 [2.8/3.1]
QID: P1427 (B2626)

A plant is operating at full power when a reactor coolant pump experiences a locked rotor. How will pump ammeter indication respond?

- A. Decreases immediately to zero due to breaker trip
- B. Decreases immediately to no-load motor amps
- C. Increases immediately to many times running current, then decreases to no-load motor amps
- D. Increases immediately to many times running current, then decreases to zero upon breaker trip

ANSWER: D.

TOPIC: 191005
KNOWLEDGE: K1.01 [2.8/3.1]
QID: P2127 (B1326)

A cooling water pump is being driven by an ac induction motor. Which one of the following describes how and why pump motor current will change if the pump shaft seizes?

- A. Decreases due to decreased pump flow
- B. Decreases due to increased counter electromotive force
- C. Increases due to decreased pump flow
- D. Increases due to decreased counter electromotive force

ANSWER: D.

TOPIC: 191005
KNOWLEDGE: K1.01 [2.8/3.1]
QID: P2827 (B1726)

A cooling water pump is being driven by an ac induction motor. Which one of the following describes how and why pump motor current will change if the pump shaft shears?

- A. Decreases due to decreased pump work
- B. Decreases due to decreased counter electromotive force
- C. Increases due to increased pump work
- D. Increases due to increased counter electromotive force

ANSWER: A.

TOPIC: 191005
KNOWLEDGE: K1.01 [2.8/3.1]
QID: P3127 (B2826)

A motor-driven centrifugal pump exhibits indications of pump failure while being started in an idle cooling water system. Assuming the pump motor breaker does not trip, which one of the following pairs of indications would be observed if the pump failure is a locked impeller shaft?

- A. Lower than normal running current with zero system flow rate
- B. Lower than normal running current with a fraction of normal system flow rate
- C. Excessive duration of starting current peak with zero system flow rate
- D. Excessive duration of starting current peak with a fraction of normal system flow rate

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.02 [2.8/2.9]
QID: P27

If the generator bearings on a motor-generator begin to overheat from excessive friction, which one of the following will occur next?

- A. Generator current will begin to increase.
- B. Generator windings will begin to heat up.
- C. Motor current will begin to decrease.
- D. Motor windings will begin to heat up.

ANSWER: D.

TOPIC: 191005
KNOWLEDGE: K1.02 [2.8/2.9]
QID: P528

Which one of the following will provide motor protection against electrical damage caused by gradual bearing degradation?

- A. Thermal overload device
- B. Overcurrent trip relay
- C. Underfrequency relay
- D. Undervoltage device

ANSWER: A.

TOPIC: 191005
KNOWLEDGE: K1.02 [2.8/2.9]
QID: P1028 (B1526)

Which one of the following will result from prolonged operation of an ac motor with excessively high stator temperatures?

- A. Decreased electrical current demand due to reduced counter electromotive force
- B. Increased electrical current demand due to reduced counter electromotive force
- C. Decreased electrical resistance to ground due to breakdown of winding insulation
- D. Increased electrical resistance to ground due to breakdown of winding insulation

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.02 [2.8/2.9]
QID: P1528 (B1126)

Continuous operation of a motor at rated load with a loss of required cooling to the motor windings will eventually result in...

- A. cavitation of the pumped fluid.
- B. failure of the motor overcurrent protection devices.
- C. breakdown of the motor insulation.
- D. phase current imbalance in the motor and overspeed trip actuation.

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.02 [2.8/2.9]
QID: P2927

To provide protection against damage to a motor, which one of the following breaker trip signals will trip the motor breaker if a motor bearing seizes while the motor is running?

- A. Instantaneous overcurrent
- B. Time-delayed overcurrent
- C. Underfrequency
- D. Undervoltage

ANSWER: B.

TOPIC: 191005
KNOWLEDGE: K1.03 [2.7/2.8]
QID: P115 (B120)

A main generator that is connected to an infinite power grid has the following indications:

100 MWe
0 MVAR
2,900 amps
20,000 Vac

If main generator excitation is reduced, amps will _____ and MWe will _____.

- A. decrease; decrease
- B. increase; decrease
- C. decrease; remain the same
- D. increase; remain the same

ANSWER: D.

TOPIC: 191005
KNOWLEDGE: K1.03 [2.7/2.8]
QID: P229

Excessive current will be drawn by an ac induction motor that is operating...

- A. completely unloaded.
- B. at full load.
- C. with open-circuited stator windings.
- D. with short-circuited stator windings.

ANSWER: D.

TOPIC: 191005
KNOWLEDGE: K1.03 [2.7/2.8]
QID: P529

A main generator that is connected to an infinite power grid has the following indications:

500 Mw
300 MVAR (VARs out)
2,800 amps

If main generator excitation is reduced slightly, current will _____ and Mw will _____.

- A. increase; decrease
- B. increase; remain the same
- C. decrease; decrease
- D. decrease; remain the same

ANSWER: D.

TOPIC: 191005
KNOWLEDGE: K1.03 [2.7/2.8]
QID: P928

A main generator is operating in parallel with an infinite power grid. If the voltage supplied to the generator field is slowly and continuously decreased, the generator will experience high current due to... (Assume no generator protective actuations occur.)

- A. excessive generator MWe.
- B. excessive generator KVAR (lagging).
- C. excessive generator KVAR (leading).
- D. generator reverse power.

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.03 [2.7/2.8]
QID: P1128 (B2228)

If the voltage supplied by an ac generator to an isolated electrical system with a power factor of 1.0 is held constant while real load (kW) is increased, the current supplied by the generator will increase in direct proportion to the _____ of the change in real load. (Assume power factor remains constant at 1.0.)

- A. square root
- B. amount
- C. square
- D. cube

ANSWER: B.

TOPIC: 191005
KNOWLEDGE: K1.03 [2.7/2.8]
QID: P1428 (B1830)

A main generator that is connected to an infinite power grid has the following indications:

600 MWe
100 MVAR (VARs in)
13,800 amps
25,000 volts

If main generator excitation is increased slightly, amps will _____ and MWe will _____.

- A. decrease; increase
- B. increase; increase
- C. decrease; remain the same
- D. increase; remain the same

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.03 [2.7/2.8]
QID: P1728 (B1729)

A main generator that is connected to an infinite power grid has the following indications:

600 MWe
100 MVAR (VARs in)
13,800 amps
25,000 volts

If main generator excitation is decreased slightly, amps will _____ and MVAR will _____.

- A. decrease; increase
- B. increase; increase
- C. decrease; decrease
- D. increase; decrease

ANSWER: B.

TOPIC: 191005
KNOWLEDGE: K1.03 [2.7/2.8]
QID: P1928 (B226)

A main generator is connected to an infinite power grid. Which one of the following conditions will exist on the generator if it is operating underexcited?

- A. Negative MVARs (VARs in) and a leading power factor
- B. Positive MVARs (VARs out) and a leading power factor
- C. Positive MVARs (VARs out) and a lagging power factor
- D. Negative MVARs (VARs in) and a lagging power factor

ANSWER: A.

TOPIC: 191005
KNOWLEDGE: K1.03 [2.7/2.8]
QID: P2027 (B2028)

A diesel generator (D/G) is supplying both kW and kVAR to an electrical bus that is connected to an infinite power grid. Assuming D/G and bus voltage do not change, if the D/G voltage regulator set point is increased slightly, then D/G kW will _____ and D/G amps will _____.

- A. remain the same; increase
- B. remain the same; remain the same
- C. increase; increase
- D. increase; remain the same

ANSWER: A.

TOPIC: 191005
KNOWLEDGE: K1.03 [2.7/2.8]
QID: P2228

A diesel generator (D/G) is supplying an electrical bus that is connected to an infinite power grid. Assuming D/G terminal voltage and bus frequency do not change, if the D/G governor set point is increased from 60.0 Hz to 60.1 Hz, D/G kVAR load will _____ and D/G amps will _____.

- A. increase; increase
- B. increase; remain the same
- C. remain the same; increase
- D. remain the same; remain the same

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.03 [2.7/2.8]
QID: P2328 (B2330)

A main generator that is connected to an infinite power grid has the following indications:

600 MWe
100 MVAR (VARs out)
13,800 amps
25,000 volts

If main generator excitation is decreased, amps will initially _____ and MVAR will initially _____.

- A. decrease; increase
- B. increase; increase
- C. decrease; decrease
- D. increase; decrease

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.03 [2.7/2.8]
QID: P2528 (B2530)

A diesel generator (D/G) is supplying both KW and KVAR to an electrical bus that is connected to an infinite power grid. Assuming bus voltage does not change, if the D/G voltage regulator set point is decreased slightly, then D/G KW will _____ and D/G amps will _____.

- A. remain the same; decrease
- B. remain the same; remain the same
- C. decrease; decrease
- D. decrease; remain the same

ANSWER: A.

TOPIC: 191005
KNOWLEDGE: K1.03 [2.7/2.8]
QID: P2628 (B1532)

A main generator that is connected to an infinite power grid has the following indications:

100 MWe
0 MVAR
2,900 amps
20,000 volts

If main generator excitation is increased, amps will _____ and MWe will _____.

- A. remain the same; increase
- B. increase; increase
- C. remain the same; remain the same
- D. increase; remain the same

ANSWER: D.

TOPIC: 191005
KNOWLEDGE: K1.03 [2.7/2.8]
QID: P2728 (B2729)

A main generator is operating in parallel with an infinite power grid. If the voltage supplied to the generator field is slowly and continuously increased, the generator will experience high current due to: (Assume no generator protective actuations occur.)

- A. generator reverse power.
- B. excessive generator MWe.
- C. excessive generator KVAR (VARs in).
- D. excessive generator KVAR (VARs out).

ANSWER: D.

TOPIC: 191005
KNOWLEDGE: K1.03 [2.7/2.8]
QID: P3229 (B3227)

A cooling water system is being returned to service following maintenance on the two identical centrifugal cooling water pumps. The two pumps take suction from a common suction header and discharge to a common discharge header. Each pump is driven by a three phase ac induction motor.

Cooling water pump A was started five minutes ago to initiate flow in the cooling water system. Cooling water pump B is about to be started in parallel alignment with pump A.

When pump B is started, which one of the following would cause the ammeter for pump B to remain off-scale high for several seconds longer than usual before returning to normal running current indication?

- A. The pump packing was removed and not reinstalled.
- B. The pump was initially rotating in the reverse direction.
- C. Two phases of the motor windings were electrically switched.
- D. The coupling between the motor and the pump was removed and not reinstalled.

ANSWER: B.

TOPIC: 191005
KNOWLEDGE: K1.03 [2.7/2.8]
QID: P3629 (B3629)

A main turbine-generator is operating in parallel with an infinite power grid. If the turbine control valves (or throttle valves) slowly fail open, the generator will experience high current primarily due to... (Assume no generator protective actuations occur.)

- A. excessive generator MWe.
- B. excessive generator KVAR (VARs out).
- C. excessive generator KVAR (VARs in).
- D. generator reverse power.

ANSWER: A.

TOPIC: 191005
KNOWLEDGE: K1.04 [2.7/2.8]
QID: P28

If the speed of a variable speed centrifugal pump is increased to cause pump flow rate to double, pump motor current will...

- A. remain constant.
- B. increase two-fold (double).
- C. increase four-fold.
- D. increase eight-fold.

ANSWER: D.

TOPIC: 191005
KNOWLEDGE: K1.04 [2.7/2.8]
QID: P120

A centrifugal pump is operating with the following parameters:

Pump speed = 1800 rpm
Pump head = 100 psid
Motor current = 10 amps

What will be the new value of pump head if the speed is increased such that the current requirements are now 640 amps?

- A. 400 psid
- B. 800 psid
- C. 1200 psid
- D. 1600 psid

ANSWER: D.

TOPIC: 191005
KNOWLEDGE: K1.04 [2.7/2.8]
QID: P228 (B227)

A centrifugal pump has a flow rate of 3,000 gpm and a current requirement of 200 amps. If the pump speed is reduced such that the flow rate is 2,000 gpm, what is the final current requirement at the new lower speed? (Assume a constant motor voltage.)

- A. 59 amps
- B. 89 amps
- C. 133 amps
- D. 150 amps

ANSWER: A.

TOPIC: 191005
KNOWLEDGE: K1.04 [2.7/2.8]
QID: P328 (B326)

A centrifugal pump is operating with the following parameters:

Speed	= 1,800 rpm
Current	= 40 amperes
Pump head	= 20 psi
Pump flow rate	= 400 gpm

What will be the new value of pump head and current if the speed is increased to 2,000 rpm?

- A. 22 psi, 49 amps
- B. 22 psi, 55 amps
- C. 25 psi, 49 amps
- D. 25 psi, 55 amps

ANSWER: D.

TOPIC: 191005
KNOWLEDGE: K1.04 [2.7/2.8]
QID: P428

A centrifugal pump is operating at 600 rpm with the following parameters:

Current = 10 amperes
Pump head = 50 psi
Pump flow rate = 200 gpm

What will be the new value of pump head if the flow is increased such that the current requirements are now 640 amperes?

- A. 400 psi
- B. 600 psi
- C. 800 psi
- D. 1,200 psi

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.04 [2.7/2.8]
QID: P630

A motor-driven centrifugal pump is operating at a low flow condition in an open system. The throttled discharge valve is then fully opened to increase system flow rate.

Which one of the following will increase?

- A. Pump discharge pressure
- B. Available net positive suction head
- C. Motor amps
- D. Pump speed

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.04 [2.7/2.8]
QID: P1329

A centrifugal pump is operating with the following parameters:

Speed = 3,600 rpm
Current = 100 amps
Pump head = 50 psi
Pump flow rate = 400 gpm

What will be the new value of pump head and current if the speed is decreased to 2,000 rpm?

- A. 8.6 psi, 30.1 amps
- B. 8.6 psi, 17.1 amps
- C. 15.4 psi, 30.1 amps
- D. 15.4 psi, 17.1 amps

ANSWER: D.

TOPIC: 191005
KNOWLEDGE: K1.04 [2.7/2.8]
QID: P1429

A two-speed centrifugal pump is driven by an ac motor with the following initial conditions:

Pump speed = 400 rpm
Motor current = 40 amps
Pump head = 60 psid

If pump speed is increased to 1600 rpm what will be the new pump head?

- A. 240 psid
- B. 480 psid
- C. 960 psid
- D. 3,840 psid

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.04 [2.7/2.8]
QID: P1530 (B2126)

A centrifugal pump is operating with the following parameters:

Speed = 1,200 rpm
Current = 40 amperes
Pump head = 20 psi
Pump flow rate = 400 gpm

What will be the approximate value of pump head and current if pump speed is increased to 1,600 rpm?

- A. 25 psi, 55 amps
- B. 25 psi, 95 amps
- C. 36 psi, 55 amps
- D. 36 psi, 95 amps

ANSWER: D.

TOPIC: 191005
KNOWLEDGE: K1.04 [2.7/2.8]
QID: P1629

A centrifugal pump is operating with the following parameters:

Speed = 1,200 rpm
Current = 40 amperes
Pump head = 20 psi
Pump flow rate = 400 gpm

What will be the approximate value of pump head and current if pump speed is increased to 1,800 rpm?

- A. 36 psi, 95 amps
- B. 36 psi, 135 amps
- C. 45 psi, 95 amps
- D. 45 psi, 135 amps

ANSWER: D.

TOPIC: 191005
KNOWLEDGE: K1.04 [2.7/2.8]
QID: P1729 (B1719)

A centrifugal pump is operating with the following parameters:

Speed = 1,800 rpm
Current = 40 amperes
Pump head = 20 psi
Pump flow rate = 400 gpm

What will be the approximate value of pump head and current if pump speed is decreased to 1,200 rpm?

- A. 13 psi, 18 amps
- B. 13 psi, 12 amps
- C. 9 psi, 18 amps
- D. 9 psi, 12 amps

ANSWER: D.

TOPIC: 191005
KNOWLEDGE: K1.04 [2.7/2.8]
QID: P1828 (B2627)

An ac motor-driven centrifugal pump is operating with a flow rate of 3,000 gpm and a motor current of 150 amps. If the pump speed is reduced such that the flow rate is 2,000 gpm, what is the approximate final motor current at the new lower speed? (Assume a constant motor voltage.)

- A. 44 amperes
- B. 59 amperes
- C. 67 amperes
- D. 100 amperes

ANSWER: A.

TOPIC: 191005
KNOWLEDGE: K1.04 [2.7/2.8]
QID: P2130 (B2229)

A centrifugal pump is operating at 600 rpm with the following parameters:

Motor current = 100 amperes
Pump head = 50 psid
Pump flow rate = 880 gpm

Which one of the following will be the approximate value of pump head if pump speed is increased to 1200 rpm?

- A. 71 psid
- B. 126 psid
- C. 172 psid
- D. 200 psid

ANSWER: D.

TOPIC: 191005
KNOWLEDGE: K1.04 [2.7/2.8]
QID: P2329 (B2321)

A multispeed centrifugal pump is operating with a flow rate of 3000 gpm. Which one of the following approximates the new flow rate if the speed is decreased from 3600 rpm to 3000 rpm?

- A. 1000 gpm
- B. 1500 gpm
- C. 2000 gpm
- D. 2500 gpm

ANSWER: D.

TOPIC: 191005
KNOWLEDGE: K1.04 [2.7/2.8]
QID: P2529 (B2527)

A multispeed centrifugal pump is operating with a flow rate of 1800 gpm at a speed of 3600 rpm. Which one of the following approximates the new flow rate if the pump speed is decreased to 2400 rpm?

- A. 900 gpm
- B. 1050 gpm
- C. 1200 gpm
- D. 1350 gpm

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.04 [2.7/2.8]
QID: P3129 (B1626)

A multi-speed motor-driven centrifugal pump is operating with the following parameters:

Motor current = 27 amps
Pump head = 50 psi
Pump flow rate = 880 gpm

Which one of the following will be the approximate new value of pump head if pump speed is increased such that the motor current is now 64 amperes?

- A. 89 psi
- B. 119 psi
- C. 211 psi
- D. 281 psi

ANSWER: A.

TOPIC: 191005
KNOWLEDGE: K1.04 [2.7/2.8]
QID: P3130 (B3127)

Which one of the following describes the relationship between the current supplied to an ac induction motor and the amount of heat generated (kW) in the motor windings?

- A. Heat generation is directly proportional to the current.
- B. Heat generation is proportional to the cube of the current.
- C. Heat generation is proportional to the square of the current.
- D. Heat generation is proportional to the square root of the current.

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.05 [2.8/2.7]
QID: P2229

Which one of the following describes the motor current indications that would be observed during the start of a large ac motor-driven centrifugal pump with a closed discharge valve?

- A. Current immediately increases to the full-load value and then decreases to the no-load value over several seconds.
- B. Current immediately increases to the no-load value and then stabilizes.
- C. Current immediately increases to greater than the full-load value and then decreases to the no-load value after several seconds.
- D. Current immediately increases to greater than the full-load value and then decreases to the no-load value after several minutes.

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.04 [2.7/2.8]
QID: P3430 (B1228)

A centrifugal pump is operating at 600 rpm with the following parameters:

Current = 100 amperes
Pump head = 50 psid
Pump flow rate = 880 gpm

What will be the approximate value of pump head if pump speed is increased such that the pump now draws 640 amperes?

- A. 93 psid
- B. 126 psid
- C. 173 psid
- D. 320 psid

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.04 [2.7/2.8]
QID: P3730 (B3722)

A rotary positive displacement pump (PDP) is being used to supply water to a piping system. The PDP is driven by an ac induction motor. The initial parameters are:

System pressure: 500 psig
PDP flow rate: 50 gpm
PDP motor current: 40 amps

After several hours, the PDP motor speed is increased such that the new PDP flow rate is 100 gpm. If system pressure does not change, what is the approximate value of the PDP motor current at the 100 gpm flow rate?

- A. 80 amps
- B. 160 amps
- C. 320 amps
- D. 640 amps

ANSWER: A.

TOPIC: 191005
KNOWLEDGE: K1.05 [2.8/2.7]
QID: P29 (B2127)

The starting current in a typical ac induction motor is significantly higher than the full-load running current because...

- A. starting torque is lower than running torque.
- B. starting torque is higher than running torque.
- C. rotor speed during start is too low to generate sufficient counter electromotive force (CEMF) in the stator.
- D. rotor current during start is too low to generate sufficient CEMF in the stator.

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.05 [2.8/2.7]
QID: P108 (B105)

The average starting current for an ac motor is approximately...

- A. the same as its normal running current.
- B. two to three times its normal running current.
- C. five to seven times its normal running current.
- D. ten to fifteen times its normal running current.

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.05 [2.8/2.7]
QID: P230

Which one of the following describes the motor current indications that would be observed during the start of a large ac motor connected to a load?

- A. Amps slowly increase to the normal operating value over a period of five time constants.
- B. Amps immediately increase to the normal operating value and stabilize.
- C. Amps immediately increase to many times the normal operating value and then decrease to the normal operating value.
- D. Amps immediately increase to the full-scale value and then decrease rapidly to zero due to overload protection.

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.05 [2.8/2.7]
QID: P429

If the discharge valve of a large motor-driven centrifugal pump is kept closed during a normal pump start, the amps indication for the ac induction motor will rise to...

- A. several times the full-load current value and then decrease to the no-load current value.
- B. approximately the full-load current value and then decrease to the no-load current value.
- C. several times the full-load current value and then decrease to the full-load value.
- D. approximately the full-load current value and then stabilize at the full-load current value.

ANSWER: A.

TOPIC: 191005
KNOWLEDGE: K1.05 [2.8/2.7]
QID: P930 (B2928)

Which one of the following causes starting current to be greater than running current for a typical ac induction motor?

- A. The rotor does not develop maximum induced current flow until it has achieved synchronous speed.
- B. After the motor starts, resistors are added to the electrical circuit to limit the running current.
- C. A large amount of starting current is required to initially establish the rotating magnetic field.
- D. The rotor field induces an opposing voltage in the stator that is proportional to rotor speed.

ANSWER: D.

TOPIC: 191005
KNOWLEDGE: K1.05 [2.8/2.7]
QID: P1230

The starting current in an ac motor is significantly higher than the full-load running current because...

- A. little counter electromotive force is induced onto the rotor during motor start.
- B. motor torque production is highest during motor start.
- C. little counter electromotive force is induced onto the stator during motor start.
- D. work performed by the motor is highest during motor start.

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.05 [2.8/2.7]
QID: P1330

Starting current in an ac induction motor is typically _____ times full-load rated current.

- A. 1/4 to 1/2
- B. 2 to 3
- C. 5 to 6
- D. 10 to 12

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.05 [2.8/2.7]
QID: P1827 (B1327)

Which one of the following describes the motor current during the start of a typical ac motor-driven centrifugal pump with a closed discharge valve? (Assume the pump does not trip.)

- A. Current immediately increases to the full-load value and then gradually decreases to the no-load value.
- B. Current immediately increases to the full-load value and then stabilizes at the full-load value.
- C. Current immediately increases to many times the full-load value and then rapidly decreases to the no-load value after several seconds and then stabilizes.
- D. Current immediately increases to many times the full-load value and then rapidly decreases to the full-load value after several seconds and then stabilizes.

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.05 [2.8/2.7]
QID: P1929 (B1428)

Which one of the following describes the typical ammeter response during a normal start of a large ac motor-driven centrifugal pump with a closed discharge valve?

- A. Indication will approach full scale and then return to the full-load value.
- B. Indication will go off scale high and then return to the no-load value.
- C. Indication will approach full scale and then return to the no-load value.
- D. Indication will go off scale high and then return to the full-load value.

ANSWER: B.

TOPIC: 191005
KNOWLEDGE: K1.05 [2.8/2.7]
QID: P2230 (B2227)

Two identical 4160 Vac induction motors are connected to identical centrifugal pumps being used to provide cooling water flow in separate systems in a power plant. Each motor is rated at 1000 hp. The discharge valve for pump A is fully open and the discharge valve for pump B is fully shut.

If each motor is then started, the longest time period required to stabilize motor current will be experienced by motor _____ and the higher stable motor current will be experienced by motor _____.

- A. A; A
- B. A; B
- C. B; A
- D. B; B

ANSWER: A.

TOPIC: 191005
KNOWLEDGE: K1.05 [2.8/2.7]
QID: P2430 (B2428)

Which one of the following describes when the highest stator current will be experienced by an ac induction motor?

- A. During motor operation at full load
- B. During motor operation at zero load
- C. Immediately after energizing the motor
- D. Immediately after deenergizing the motor

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.05 [2.8/2.7]
QID: P2730 (B2727)

Two identical 4160 Vac induction motors are connected to identical centrifugal pumps in identical but separate cooling water systems. Each motor is rated at 200 hp. The discharge valve for pump A is fully shut and the discharge valve for pump B is fully open.

If each motor is then started, the longest time period required to stabilize motor current will be experienced by motor _____ and the higher stable motor current will be experienced by motor _____.

- A. A; A
- B. A; B
- C. B; A
- D. B; B

ANSWER: D.

TOPIC: 191005
KNOWLEDGE: K1.05 [2.8/2.7]
QID: P2830 (B2828)

Two identical 4160 Vac induction motors are connected to identical centrifugal pumps being used to provide cooling water flow in separate identical systems in a power plant. Each motor is rated at 1000 hp. The discharge valve for pump A is fully shut and the discharge valve for pump B is fully open.

If each motor is then started, the longer time period required to stabilize motor current will be experienced by motor _____ and the higher stable motor current will be experienced by motor _____.

- A. A; A
- B. A; B
- C. B; A
- D. B; B

ANSWER: D.

TOPIC: 191005
KNOWLEDGE: K1.05 [2.8/2.7]
QID: P2931 (B3529)

Two identical 4160 Vac induction motors are connected to identical centrifugal pumps in identical but separate cooling water systems. Each motor is rated at 200 hp. The discharge valve for pump A is fully shut and the discharge valve for pump B is fully open.

When the motors are started under these conditions, the shorter time period required to reach a stable running current will be experienced by motor _____, and the higher stable running current will be experienced by motor _____.

- A. A; A
- B. A; B
- C. B; A
- D. B; B

ANSWER: B.

TOPIC: 191005
KNOWLEDGE: K1.06 [3.0/3.1]
QID: P30 (B1826)

What is the primary reason for limiting the number of starts for an electric motor in a given period of time?

- A. Prevent overheating of the windings due to high starting currents.
- B. Prevent overheating of the windings due to shorting within the stator.
- C. Prevent rotor damage due to excessive cyclic stresses on the shaft.
- D. Prevent rotor damage due to excessive axial displacement of the shaft.

ANSWER: A.

TOPIC: 191005
KNOWLEDGE: K1.06 [3.0/3.1]
QID: P231 (B328)

Which one of the following is the basis for restricting the number of starts that a large ac motor may be subjected to within a one-hour period?

- A. Prevent excessive torsional stresses on the motor shaft
- B. Prevent excessive arcing and degradation of motor breaker contacts
- C. Prevent excessive heat buildup within the motor windings
- D. Prevent excessive wear of motor thrust bearings

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.06 [3.0/3.1]
QID: P1031

The number of starts for an electric motor in a given period of time should be limited because overheating of the _____ can occur due to the _____ counter electromotive force produced at low rotor speeds.

- A. windings; low
- B. windings; high
- C. commutator and/or slip rings; low
- D. commutator and/or slip rings; high

ANSWER: A.

TOPIC: 191005
KNOWLEDGE: K1.06 [3.0/3.1]
QID: P1131

The frequency of start/stop cycles for an electrical motor is limited to prevent...

- A. overheating the motor windings.
- B. overheating the motor supply bus.
- C. excessive shaft torsional stresses.
- D. excessive cycling of the motor breaker.

ANSWER: A.

TOPIC: 191005
KNOWLEDGE: K1.06 [3.0/3.1]
QID: P1331 (B1128)

Frequent start/stop cycling of large ac motors is prohibited to prevent...

- A. excessive bearing wear.
- B. motor shaft imbalance.
- C. overloading electrical buswork.
- D. overheating motor windings.

ANSWER: D.

TOPIC: 191005
KNOWLEDGE: K1.06 [3.0/3.1]
QID: P2531 (B2528)

Frequent starts of large motors will result in overheating of the motor windings due to high current flow caused by...

- A. low electrical resistance of the motor windings.
- B. an electrical short circuit between the rotor and stator.
- C. high counter electromotive force at low rotor speeds.
- D. windage losses between the rotor and stator.

ANSWER: A.

TOPIC: 191005
KNOWLEDGE: K1.06 [3.0/3.1]
QID: P2631 (B228)

Which one of the following is the reason for limiting the number of motor starts in a given time period?

- A. Minimizes pitting of contacts in the motor breaker
- B. Prevents excessive torsional stresses on motor shaft
- C. Prevents overheating of motor windings
- D. Minimizes axial stresses on motor bearings

ANSWER: C.

TOPIC: 191005
KNOWLEDGE: K1.06 [3.0/3.1]
QID: P3331 (B3327)

A large centrifugal pump is driven by a 200 horsepower 4.16 kV ac motor. The motor breaker control circuit contains the following protection devices: instantaneous overcurrent relay, motor thermal overload relay, control power fuses, and an anti-pumping device.

The pump had been manually started and stopped several times during a 5-minute period when the motor breaker unexpectedly tripped. In this situation, which one of the following is the most likely cause of the breaker trip?

- A. Instantaneous overcurrent
- B. Motor thermal overload
- C. Blown control power fuse
- D. Anti-pumping device actuation

ANSWER: B.